What is claimed is:

1. A protection switch in a node of a two-fiber optical channel shared protection ring, the node including a plurality of primary clients and a plurality of pre-emptible clients, each fiber in the two-fiber optical channel shared protection ring propagating at least one working wavelength channel dedicated to primary client traffic and at least one protection wavelength channel which may accommodate extra client traffic, the protection switch comprising:

an optical signal monitor coupled to the two-fiber optical channel shared protection ring, the optical signal monitor being operative to detect multi-wavelength channel failures and single wavelength channel failures in the two-fiber optical channel shared protection ring; and

an electrical switching circuit coupled to the optical signal monitor, the electrical switching circuit being comprised of a plurality of modular switching fabrics, each modular switching fabric of the plurality of modular switching fabrics including a ring switch mode that is responsive to at least one of the multi-wavelength channel failures, and a span switch mode that is responsive to at least one of the single wavelength channel failures.

2. The protection switch of claim 1, wherein the ring switch is operative to switch a primary client's transmission signal from a working wavelength propagating on a first fiber of the two fibers to a protection wavelength propagating on a second fiber of the two fibers, switch the primary client's receive signal from a working wavelength propagating on the second fiber to a protection wavelength propagating on the first fiber, and pre-empt the extra client traffic.

3. The protection switch of claim 2, wherein the multi-wavelength channel failure is a cable cut severing the first fiber and the second fiber between a first node and a second node in the ring.

4. The protection switch of claim 1, wherein the span switch is operative to switch a primary client's transmission signal from a working wavelength propagating on the first fiber

to a protection wavelength propagating on the first fiber, and switch a primary client's receive signal from a working wavelength propagating on the second fiber to a protection wavelength propagating on the second fiber.

5. The protection switch of claim 4, wherein the single wavelength channel failure includes an inoperative working wavelength channel.

6. The protection switch of claim 1, wherein each modular switching fabric includes a controller programmed to respond to the single wavelength channel failure and the multi-wavelength channel failure.

7. The protection switch of claim 1, wherein each modular switching fabric includes a plurality of 2 x 1 switches, and a plurality of 3 x 1 switches.

8. The protection switch of claim 7, wherein the plurality of 2 x 1 switches and the plurality of 3 x 1 switches are fabricated using gated semiconductor devices.

9. The protection switch of claim 7, wherein the plurality of 2 x 1 switches and the plurality of 3 x 1 switches are fabricated using data selectors.

10. The protection switch of claim 1, further comprising:

a first add multiplexer coupled to the first fiber and the electrical switching circuit;

a first drop multiplexer coupled to the first fiber and the electrical switching circuit;

a second add multiplexer coupled to the second fiber and the electrical switching circuit; and

a second drop multiplexer coupled to the second fiber and the electrical switching circuit.

11. The protection switch of claim 10, wherein the first add multiplexer, the first drop multiplexer, the second add multiplexer, and the second drop multiplexer operate in a range of wavelengths including 1550nm.

12. The protection switch of claim 10, wherein the first add multiplexer inserts the primary client's transmission onto the first fiber using a first fiber working wavelength channel.

13. The protection switch of claim 10, wherein the first add multiplexer inserts the primary client's transmission onto the first fiber using a first fiber protection wavelength channel in response to a multi-wavelength channel failure.

14. The protection switch of claim 10, wherein the second add multiplexer inserts the primary client's transmission onto the second fiber using a second fiber working wavelength channel.

15. The protection switch of claim 10, wherein the second add multiplexer inserts the primary client's transmission onto the second fiber using a second fiber protection wavelength channel in response to a single wavelength channel failure.

16. The protection switch of claim 10, wherein the first drop multiplexer drops a first fiber working wavelength channel from the first fiber to thereby route the primary client's receive signal to the electrical switching circuit.

17. The protection switch of claim 10, wherein the first drop multiplexer drops a first fiber protection wavelength channel from the first fiber to thereby route the primary client's receive signal to the electrical switching circuit in response to a multi-wavelengthchannel failure.

18. The protection switch of claim 10, wherein the second drop multiplexer drops a second fiber working wavelength channel from the second fiber to thereby route the primary client's receive signal to the electrical switching circuit.

19. The protection switch of claim 10, wherein the second drop multiplexer drops a second fiber protection wavelength channel from the second fiber to thereby route the

primary client's receive signal to the electrical switching circuit in response to a single wavelength channel failure.

20. The protection switch of claim 10, further comprising:

a first optoelectric converter coupled to the first drop multiplexer and a modular switching fabric, the first optoelectric converter adapted to convert a first fiber working wavelength channel dropped from the first fiber into a first data signal readable by the modular switching fabric;

a second optoelectric converter coupled to the first drop multiplexer and the modular switching fabric, the second optoelectric converter adapted to convert a first fiber protection wavelength channel dropped from the first fiber into a second data signal readable by the modular switching fabric;

a third optoelectric converter coupled to the second drop multiplexer and the modular switching fabric, the third optoelectric converter adapted to convert a second fiber working wavelength channel dropped from the second fiber into a third data signal readable by the modular switching fabric; and

a fourth optoelectric converter coupled to the second drop multiplexer and the modular switching fabric, the fourth optoelectric converter adapted to convert a second fiber protection wavelength channel dropped from the second fiber into a fourth data signal readable by the modular switching fabric.

21. The protection switch of claim 20, wherein the modular switching fabric further comprises:

a first 3 x 1 switch having inputs coupled to the first optoelectric converter, second optoelectric converter, third optoelectric converter, and an output coupled to a first primary client receiver;

a first 2 x 1 switch having inputs coupled to the second optoelectric converter and an output coupled to a first extra client receiver;

a second 3 x 1 switch having inputs coupled to the second optoelectric converter, third optoelectric converter, fourth optoelectric converter, and an output coupled to a second primary client receiver;

a second 2 x 1 switch having inputs coupled to the third optoelectric converter and an output coupled to a second extra client receiver; and

a controller coupled to the first 2 x 1 switch, the second 3 x 1 switch, the second 2 x 1 switch, and the second 2 x 1 switch, the controller being operative to actuate the switches in response to the multi-wavelengthchannel failure, whereby the primary client's receive signal is received from a protection wavelength channel propagating on the first fiber instead of from a working wavelength channel propagating on the second fiber, and the extra client traffic is pre-empted.

22. The protection switch of claim 21, wherein the controller is operative to actuate the switches to receive the primary client's receive signal from a protection wavelength propagating on a fiber instead of a working wavelength channel on the fiber in response to the at least one fault condition being an inoperative working wavelength channel.

23. The protection switch of claim 10, further comprising:

a first electrooptic converter coupled to the first add multiplexer and a modular switching fabric, the first electrooptic converter adapted to convert a first data signal received from the modular switching fabric into a first-fiber wavelength channel to be added to first fiber traffic;

a second electrooptic converter coupled to the first drop multiplexer and the modular switching fabric, the second electrooptic converter adapted to convert a second data signal received from the modular switching fabric a second first-fiber wavelength channel to be added to first fiber traffic;

a third electrooptic converter coupled to the second drop multiplexer and the modular switching fabric, the third electrooptic converter adapted to convert a third data signal received from the modular switching fabric into a second-fiber wavelength channel to be added to second fiber traffic; and

a fourth electrooptic converter coupled to the second drop multiplexer and the modular switching fabric, the fourth electrooptic converter adapted to convert a fourth data signal received from the modular switching fabric into a second second-fiber wavelength channel to be added to second fiber traffic.

24. The protection switch of claim 23, wherein the modular switching fabric further comprises:

a first 3 x 1 switch having an output coupled to the second electrooptic converter, and inputs coupled to a first primary client transmitter, a first extra client transmitter, and a second primary client transmitter;

a first 2 x 1 switch having an input coupled to the first extra client transmitter and an output connected to the first 3 x 1 switch;

a second 3 x 1 switch having an output coupled to the third electrooptic converter, and inputs coupled to a first primary client transmitter, a second extra client transmitter, and a second primary client transmitter;

a second 2 x 1 switch having an input coupled to the second extra client transmitter and an output connected to the second 3 x 1 switch; and

a controller coupled to the first 3 x 1 switch, the second 3 x 1 switch, the first 2 x 1 switch, and the second 2 x 1 switch, the controller being operative to actuate the switches in order to switch a primary client's transmission signal from a working wavelength channel propagating on a first fiber to a protection wavelength channel propagating on a second fiber in response to the multi-wavelengthchannel failure.

25. The protection switch of claim 24, wherein the controller is operative to switch a primary client's transmission signal from the working wavelength channel propagating on the first fiber to the protection wavelength channel propagating on the first fiber in response to a single wavelength channel failure.

26. The protection switch of claim 1, further comprising:

a plurality of electrooptic converters coupled to a modular switching fabric and a plurality of client receivers, the plurality of electrooptic converters being operative to convert working data signals and extra data signals transmitted by the electrical switch circuit into 1310nm optical signals for reception by the plurality of client receivers; and

a plurality optoelectric converters coupled to the modular switching fabric and a plurality of client transmitters, the plurality optoelectric converters being operative to convert

1310nm optical signals transmitted from the plurality of client transmitters into working data signals and protection data signals for use by the modular switching fabric.

27. The protection switch of claim 1, wherein each modular switching fabric includes an application specific integrated circuit (ASIC).

28. A modular switching fabric for use in a protection switch resident in a node of a two-fiber optical channel shared protection ring, each node including a plurality of primary clients and a plurality of pre-emptible clients, each fiber of the two fibers propagating at least one working wavelength channel dedicated to primary client traffic and at least one protection wavelength channel which may accommodate extra client traffic, the protection switch comprising:

a first 3 x 1 switch coupled to a first primary client receiver;

a first 2 x 1 switch coupled to a first extra client receiver;

a second 3 x 1 switch coupled to a second primary client receiver;

a second 2 x 1 switch coupled to a second extra client receiver; and

a controller coupled to the first 3 x 1 switch, the second 3 x 1 switch, the first 2 x 1 switch, and the second 2 x 1 switch, the controller being operative to actuate the switches in order to receive the primary client's receive signal from a protection wavelength propagating on the first fiber instead of a working wavelength channel propagating on the second fiber, and pre-empt extra client traffic, in response to a multi-wavelengthchannel failure.

29. The two-fiber optical channel shared protection ring of claim 26, wherein the controller is operative to actuate the switches to receive the primary client's receive signal from a protection wavelength propagating on a fiber instead of a working wavelength channel on the fiber in response a single wavelength channel failure.

30. A two-fiber optical channel shared protection ring for bi-directional communications between a plurality of nodes, each node including a plurality of primary clients and a plurality of pre-emptible clients, each fiber of the two fibers propagating at least one working wavelength channel dedicated to primary client traffic and at least one

protection wavelength channel which may accommodate extra client traffic, the protection switch comprising:

a first 3 x 1 switch having inputs coupled to a first primary client transmitter, a first extra client transmitter, and a second primary client transmitter;

a first 2 x 1 switch having an input coupled to the first extra client transmitter and an output connected to the first 3 x 1 switch;

a second 3 x 1 switch having inputs coupled to a first primary client transmitter, a second extra client transmitter, and a second primary client transmitter;

a second 2 x 1 switch having an input coupled to the second extra client transmitter and an output connected to the second 3 x 1 switch; and

a controller coupled to the first 3 x 1 switch, the second 3 x 1 switch, the first 2 x 1 switch, and the second 2 x 1 switch, the controller being operative to actuate the switches in order to switch a primary client's transmission signal from a working wavelength propagating on a first fiber of the two fibers to a protection wavelength propagating on a second fiber of the two fibers in response to a multi-wavelength channel failure.

31. The protection switch of claim 30, wherein the controller is operative to switch a primary client's transmission signal from the working wavelength propagating on the first fiber to the protection wavelength propagating on the first fiber in response to a single wavelength channel failure.

32. A method for switching bi-directional traffic between a plurality of nodes in a two-fiber optical channel shared protection ring, each node including a plurality of primary clients and a plurality of pre-emptible clients, each fiber of the two fibers propagating at least one working wavelength channel dedicated to primary client traffic and at least one protection wavelength channel which may accommodate extra client traffic, the method comprising:

providing a protection switch in each node of the plurality of nodes, each protection switch being coupled to the two fibers, the plurality of primary clients, and the plurality of pre-emptible clients, wherein the protection switch includes a plurality of modular switching fabrics;

detecting a fault condition in the two-fiber optical channel shared protection ring;

actuating at least one of the modular switching fabrics in response to the step of detecting, whereby a primary client's transmission signal is switched from a working wavelength propagating on a first fiber of the two fibers to a protection wavelength propagating on a second fiber of the two fibers, switching the primary client's receive signal from a working wavelength propagating on the second fiber to a protection wavelength propagating on the first fiber, and pre-empting extra client traffic.

33. The method of claim 32, wherein the fault condition is a multi-wavelengthchannel failure.

34. The method of claim 32, wherein the step of actuating includes switching a primary client's transmission signal from the working wavelength propagating on the first fiber to the protection wavelength propagating on the first fiber, and switching the primary client's receive signal from a working wavelength propagating on the second fiber to a protection wavelength propagating on the second fiber.

35. The method of claim 34, wherein the fault is a single wavelength channel failure.